

4.2.4. GEODETIC INVESTIGATIONS ON THE TERRITORY OF BOSNIA AND HERZEGOVINA

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4.2.4.1. Introduction

The main aim of this paper is to present geodetic investigations in this area, geotectonic characteristics of the Dinarides in Bosnia and Herzegovina, and to discuss their seismicity and seismotectonics.

The plate dynamic in the Dinaride region is characterized by a collision between the Eurasian and African plates. In response to this dynamics, many systems of faults and nappes having a NW-SE and NE-SW trending have been generated along Dinarides. The majority of the determined faults are from the neotectonic age and they have significance for seismotectonic activities. The Bosnia and Herzegovina area has experienced some significant earthquakes in the last centuries, the most severe is that of Banja Luka city on October, 27. 1969. On the basis of these data, it can be concluded that the intensive seismotectonic activity occurs in the zone along large neotectonic faults in the NW-SE direction, and along those that are in transversal direction.

The investigation of crustal movement in this area get benefits of the modern technology development such as the precise satellite positioning. Several GPS campaigns were carried out in Bosnia and Herzegovina, providing valuable geodynamic data of this very interesting part of Dinarides and Mediterranean.

Bosnia and Herzegovina is composed of three geomorphologic units (Mulic and al., 2006): the Panonian Plain, the Dinaric mountain range, and the Adriatic zone. Besides, Bosnia and Herzegovina is composed of a complex assemblage of geological units, including the sedimentary, igneous and metamorphic rocks that range in age from Paleozoic to Cenozoic. This geologic framework comprises three geotectonic zones: the Outer, Central and Inner Dinarides. The detailed description of lithology and stratigraphy of the area have been described by Cicic (2002). The new geological map 1:300 000 of Bosnia and Herzegovina was published in 2003. Furthermore, the new tectonic map with data of seismic activity was published by Hrvatic, (2005).

Geodetic investigation using GPS started in 1996. After that many different activities took part and will be described later on.

4.2.4.2. Geodynamical investigations using GPS in Bosnia and Herzegovina

Geodetic investigation using Global Positioning System (GPS) started in 1996, when five points of the old trigonometric national network were observed during GPS campaign CROREF 96. In the year 1998 in Bosnia and Herzegovina there was organised GPS campaign EUREF 98, also known as Balkan'98 GPS campaign. The campaign was organised in five sessions for 24 hours. 13 points were observed in Bosnia and Herzegovina. Five points observed in GPS campaign CROREF 96 were re-observed. In the GPS campaign EXTENDED SAGET 98 (Satellite Geodynamical Traverses) one point in Ilidza near Sarajevo was observed for five days. The data were processed at the Institute of Geodesy and Geodetic Astronomy of the Warsaw University of Technology. The next year, 1999, Bosnia and Herzegovina became officially a member of CERGOP (Central European Regional Geodynamics Project). The SRJV site in Sarajevo was established (GPSweek No 1038) as a permanent station on the roof of the building of Geodesy Department of Civil Engineering Faculty of Sarajevo University. The station has been part of EPN (European Permanent Network) since November 1999, and included in EUREF weekly solution. Fig. 4.2.4.1. shows SRJV time series (www.epncb.oma.be/dataproducts/timeseries/cleanedseries/). It was the first permanent GPS station within territory of former Yugoslavia. It participated in all CEGRN (Central European GPS Reference Network) GPS campaigns: CEGRN 99, CEGRN 01, CEGRN 03, CEGRN 05, and planned to be involved in CEGRN 07.

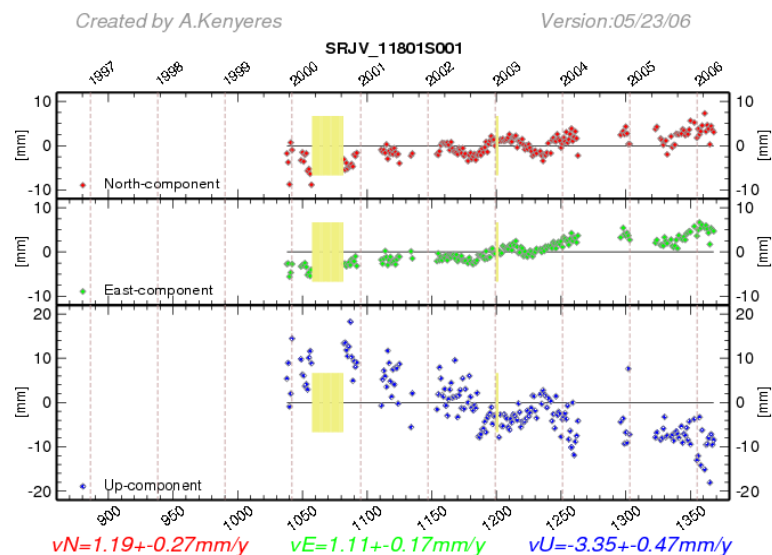


Fig. 4.2.4.1. Sarajevo permanent station SRJV time series.
(www.epncb.oma.be/_dataproducs/timeseries/cleanedseries/)

In the frame of CEGRN 99 one trigonometric point in Gradacac was observed (it was observed before in CROREF 96 and BIHREF 98 GPS campaigns, too). This point was not officially accepted as an epoch CEGRN station, but the observation data were available for processing.

There are two GPS campaigns, organised in Bosnia and Herzegovina which data are used for geodynamical investigation: The first one – BIHREF 98, which was carried out with the aim to establish the new reference network. This campaign was a part of EUREF 98 and 13 points were observed, (Mulic and al., 1999). The second one, BIHREF 2000 GPS campaign was organised by Bosnian Geodetic Authorities with the aim to densify the GPS reference network; there were observed 23 new points and five points observed before in BIHREF 98 and CROREF 96.

In the frame of CEGRN 05 GPS campaign 15 stations were observed for five day in the sessions of 24 hours. The data were processed at three CERGOP Analysis Centres. The analysis of processing results will give valuable information of very interesting area from geodynamical point of view.

The observation data of CEGRN 05 stations were investigated for multipath effects. Interesting results will be described later on. Here will be pointed out that Software Wasoft was used for the investigation. The important conclusion was that there were strong multipath effects detected by this software, some points were problematic during processing of CEGRN 05 campaign: Aladinica Brdo, Cvrsnica and Bjelasnica.

4.24.3. Conclusion

There are valuable sets of GPS observing data from the Bosnian and Herzegovinian territory which in further analysing could be used for the further research in the region of Balkan Peninsula.

4.2.4.4. References

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